

CYANEA CARLSONII ROCK AND THE UNNATURAL DISTRIBUTION OF
SPHAGNUM PALUSTRE L.

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Invited by retired Forester L. W. Bryan (*) to see Cyanea carlsonii, described by J. F. Rock (**), the Degeners and National Park Ranger T. L. Picco and wife left the Volcano area for an overnight stay in the village of Captain Cook, District of Kona, Island of Hawaii. Early on May 30, 1969, Col. Bryan led them for miles along private jeep roads chiefly at elevations between 2,000 and 5,000 feet in the Honaunau Forest Reserve. Here three healthy Carlson (***) cyanea, two to three meters tall, could be studied in the open rainforest, one protected from cattle by being on the safe side of a fence. In the neighborhood was the remains of a specimen, apparently dead of old age, consisting of a single, almost erect stem ten meters tall. This species is palm-like in habit, bearing at the end of its single leaf- and inflorescence-scarred trunk a crowded tuft of short-petioled (hardly "sessile"), linear-oblong leaves up to 70 cm. long and 10 cm. wide. When such plants are decapitated they either produce a few adventitious branches to continue an unnatural growth, or more likely die. One plant studied bore several branches which we relieved of three leaves, though we augmented our supply for museum specimens by retrieving several dead ones from the ground. The type plant, it was related, shown to a visiting California botanist who surreptitiously bagged its single stem for a museum specimen, unfortunately had died! The species evidently is on the verge of extinction.

Two species of sphagnum are known from the Hawaiian Islands. One is Sphagnum wheeleri C. Müll., an endemic limited to the Hawaiian Islands and known to Bartram (****) only from three collections coming from bogs at higher elevations of West Maui: two from Mt. Eke (C. N. Forbes; Degener & Wiebke, in 1927) and a third from the Honokohau drainage basin (C. N. Forbes).

The other sphagnum known from this archipelago is S. palustre L., a cosmopolitan moss with Europe as the type locality. This was known to Bartram only from the District of Kohala, Island of Hawaii. The occasional reports ascribing this sphagnum to other areas of the Hawaiian Islands, unless a voucher specimen exists, we hardly take seriously as one of the three native "white fork mosses" of the genus Leucobryum could easily be mistaken for a sphagnum by an amateur. In fact, as recently as September, 1968, National Park Ranger Ralph Harris asked about a sphagnum on the Island of Maui. As he wisely submitted a voucher specimen that proved to be, not a Leucobryum, but a Rhizogonium, we could scotch that rumor quickly.

The senior writer decades ago collected abundant material of

Sphagnum palustre along the plateau at the head of Waipio Valley, District of Kohala, of which exsiccatae have been widely distributed; and both Degeners have admired the masses of sphagnum, conspicuously blanketing the plateau bog and the edge of the pali, or cliff, with pale yellow whenever flying over this same region.

On the return trip, after admiring the cyanea, the Degeners were elated to find a sphagnum along the rainforest road, growing in healthy tufts among bushes and sparse grass. Their elation at apparently discovering a new sphagnum or at least a new station for S. palustre forty-two miles distant as the crow flies from Waipio was premature. Col. Bryan explained that sphagnum was harvested as early as 1919 above Waipio as it was cheaper getting this native supply than importing sphagnum from the Mainland, with the additional benefit that local material would be free of troublesome exotic weed seeds. To harvest this heavy moss, it was merely passed through an old-fashioned clothes wringer to free it of water before hauling to the government nursery in Hilo for storing. This supply was used for enbaling earth-free seedlings of exotic timber trees before carrying them into the jungle for planting. The moss we found on May 30, 1969, evidently grew from material used in packing seedlings of various species of Pinus, Toona, of Fraxinus uhdei, etc., to this general area between 1962 and 1964. Whether the sphagnum became naturalized in this new station from spores or from desiccated, dormant gametophyte fragments, or both, we do not know.

To verify that the collection (Degeners & Bryan 31,954) was truly S. palustre, it was carefully studied by modern methods: The stem is up to 18 cm. long though often only 5-7 cm., stiff but fragile, in cross section having a reddish brown woody cylinder bearing three layers of fibrillose cortical cells of which the outer have 1 pore. Stem leaves broadly lingulate, very concave, 2.2 mm. long, 1.0 mm. wide; margins from apex to near rounded base eroded; hyaline cells fibrillose except at apex. Branch leaves broadly ovate, 2.7 mm. long, 1.5 mm. wide, very concave; margins inflexed; apex cucullate and rough by projecting cells; many big pores in corners of hyaline cells and all fibrillose; chlorophyll cells in cross section narrow-elliptic to -trapezoidal with the wider base exposed on inner surface of leaf. Even though the specimens were sterile, the above description coincides specifically with S. palustre L., as occurring in Europe.

We mention this find of our native, but not endemic, sphagnum lest botanical workers confuse the natural with the "unnatural" range of S. palustre on the Island of Hawaii. This species, incidentally, can readily be distinguished from S. wheeleri C. Müll. by the leaves rough at the back of the apex and the fibrillose cortical cells of stem and branches.

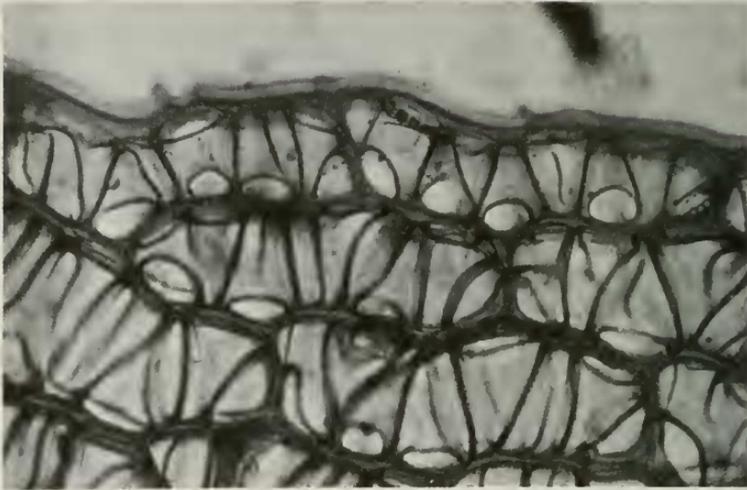
*Lester W. Bryan was born in Boston, Massachusetts, in 1895. After a year during World War I in Europe, he later engaged in

engineering in California. He arrived in Honolulu on May 1, 1921; and soon held the dual position of forester in charge of the extensive Hawaiian Sugar Planters Association Forest Reserves on the Island of Hawaii, and Forestry officer for the Territory of Hawaii. When the Association discontinued its forestry program in 1949, he continued at Territorial and later State Forester until his retirement in 1961. This was full time except for the interruption of World War II when Col. Bryan was assigned various duties in the Pacific, the last being that of Commanding Officer of Christmas Island. He is largely responsible for the introduction of exotic timber trees, as well as fruit trees and ornamentals, thus changing the aspect of the Hawaiian Islands in many areas. According to his "Twenty-five Years of Forestry Work on the Island of Hawaii" in Haw. Planters' Record 51 (1): 1--80. 1947, he and his colleagues had introduced over 1,200 taxa of exotic plants. This pamphlet describes, with pertinent remarks, at what elevations each surviving taxon was planted; and whether its vigor was excellent, good, fair, or poor. We emphasize the existence of this forestry work because of its importance regarding plant introductions, introductions not generally known to the botanist. Since that time he has introduced many additional exotics, such as Metasequoia glyptostroboides, for which he maintains up-to-date records for eventual publication.

**Rock, J. F., in B. P. Bishop Mus. Occas. Pap. 22 (5): 60--63, fig. 14. 1957.

***Norman K. Carlson in 1949--1953 was Range Conservationist with the Soil Conservation Service, and since 1953 has been head of the Division of Agriculture and Forestry of the Bernice Pauahi Bishop Estate. Dr. Rock described the new species from sterile material. Mr. Carlson cultivated one of the plants in his garden, at length getting the unknown flowers and fruit. Rock described these structures in the B. P. Bishop Mus. Occas. Pap. 23 (5): 70, fig. 3, August 17, 1962. Note that Dr. F. E. Wimmer died on May 2, 1961, predeceasing his friend Rock who died on December 5, 1962; yet Wimmer described the flowers and fruit posthumously, unless, of course, Dr. K. H. Rechinger did so for him when completing the manuscript for publication, in "Das Pflanzenreich" in 1968.

***Bartram, E. B., Manual of Hawaiian Mosses, pp. 11, 12. 1933.



Part of branch leaf of Sphagnum palustre L., showing
hyaline, fibrillose cells with large pores,
X 600